

CLAIMS:

[1] An induction heating method of an article made of a thin sheet for heating inductively a region to be heated to a temperature equal to or more than a target temperature higher than a magnetic transformation point by applying a high-frequency current to a heating inductor having an inductive portion for heating inductively the whole of the region to be heated demarcated in the article made of the thin sheet simultaneously, said method comprising:

a step of increasing temperature for increasing the temperature of the region to be heated by an induction heating using the heating inductor;

a step of reducing a temperature difference to be set at least one time for reducing the temperature difference in the region to be heated by stopping or reducing temporarily a power application of the high-frequency current to the heating inductor after said step of increasing the temperature; and

a step of reincreasing temperature for reincreasing the temperature of region to be heated by resuming the power application of the high-frequency current to the heating inductor to increase the temperature of the whole of the region to be heated to a temperature equal to or more than the target temperature.

[2] The induction heating method of the article made of the thin sheet according to claim 1, further comprising:

a step of quenching for quenching at least the whole of the region to be heated to harden the whole of the region to be heated which is heated to a temperature equal to or more than the target temperature, set up after said step of reincreasing the temperature.

[3] An induction heating apparatus of an article made of a thin sheet,

comprising:

a heating inductor including an inductive portion corresponding to the whole of a region to be heated demarcated in the article made of the thin sheet; and

a power supply device for applying a high-frequency current to said heating inductor to heat inductively the region to be heated to a temperature equal to or more than a target temperature higher than the magnetic transformation point,

wherein said power supply device comprises a current controller for stopping or reducing temporarily the power application of the high-frequency current to said heating inductor before the region to be heated reaches the target temperature.

[4] The induction heating apparatus of the article made of the thin sheet according to claim 3, wherein said current controller is a timer type controller having a timer for stopping or reducing temporarily the power application of the high-frequency current to said heating inductor when a time measured by the timer comes to a predetermined elapsed time since from the start of the power application of the high-frequency current to said heating inductor.

[5] The induction heating apparatus of the article made of the thin sheet according to claim 3, wherein said current controller is an actual temperature measurement type controller having a temperature measurer for measuring the temperature of the region to be heated, for stopping or reducing temporarily the power application of the high-frequency current to said heating inductor when the temperature of the region to be heated measured by the temperature measurer becomes a predetermined temperature.

[6] The induction heating apparatus of the article made of the thin

sheet according to claim 3, wherein said current controller is an impedance-knowing type controller having a frequency tracker for tracking the high-frequency current of said heating inductor corresponding to an impedance of the region to be heated, for stopping or reducing temporarily the power application of the high-frequency current to said heating inductor when a resonant frequency of the high-frequency current tracked by the frequency tracker becomes a predetermined frequency.

[7] The induction heating apparatus of the article made of the thin sheet according to claim 3, wherein said heating inductor is constituted with a plurality of good conductors whereof an inductive portion extends along an extending direction of the region to be heated arranged side by side in a direction perpendicular to the extending direction so that the region to be heated is covered, and constituted with the plural good conductors connected in parallel.

[8] The induction heating apparatus of the article made of the thin sheet according to claim 3, further comprising a quencher for quenching at least the region to be heated after the region to be heat reaches a temperature equal to or more than the target temperature.

[9] An article made of a thin sheet in which the whole of a region to be heated is heated inductively to a temperature equal to or more than a target temperature higher than the magnetic transformation point, wherein the heating of the region to be heated to a temperature equal to or more than the target temperature comprises: a step of increasing temperature for increasing the temperature of the region to be heated by an induction heating; a step of reducing a temperature difference to be set at least one time for reducing the temperature difference of the region to be heated by stopping or reducing temporarily an induction heating after said step of increasing the temperature; and a step of reincreasing temperature for

reincreasing the temperature of the region to be heated by resuming the induction heating to increase the temperature of the whole of the region to be heated to a temperature equal to or more than the target temperature after said step of reducing the temperature difference.

[10] The article made of the thin sheet according to claim 9, wherein the whole of the region to be heated, which is heated to a temperature equal to or more than said target temperature is quenched, so that the region to be heated is hardened by the quenching.

[11] The article made of the thin sheet according to claim 9, wherein the article composes a vehicle body of a four-wheel vehicle.

[12] The article made of the thin sheet according to claim 11, wherein the article composing the vehicle body of the four-wheeled vehicle is a reinforcing member for a center pillar.